

## Description

Method for operating an electronic device and electronic device

- 5 The invention relates to a method for operating an electronic device according to the preamble of claim 1 and an electronic device according to the preamble of claim 6.

Electronic devices for commercial or private use - including, in particular, telephone terminals but also devices from the field of so-called consumer electronics, i.e. audio and video devices, cameras, organizers etc. - are nowadays increasingly provided with supplementary functions which go beyond the functionality necessary for the operation and are intended to offer advantages in serviceability to the user in order to increase the marketing chances. In many cases, the implementation of such supplementary functions is associated with considerable development and cost expenditure.

- 20 In the practical use of such electronic devices with supplementary functionality, however, little utilization of the supplementary functions can be registered in many cases so that the possible advantages of serviceability are not actually realized by the user. One of the causes of this - if not the most important one - can be seen in the fact that the supplementary functions in question are not known to the user at all or if at all, then only as catchphrases, i.e. without any real understanding of their operation and the useful effects that could be achieved by them. In this connection, the psychological effect is also of significance that sometime after the purchase of a new device, the interest in functions going beyond the basic functions clearly diminishes and the supplementary functions not intensively used in the first phase of utilization are increasingly forgotten and are later no longer activated at all.

Especially in the case of modern telephones, both in line-connected feature telephones and in cordless and mobile telephones, a large number of supplementary functions is implemented in order to satisfy the requirements of sophisticated users. These are the following functions, for example:

- last number redialling
- internal calls
- electronic directory
- 10 - macros
- barring
- pocket money account
- office codes
- temporary PD/DTMF switching
- 15 - call groups
- MSN in ISDN
- CLIP functions
- inquiry, toggling etc.

20 Most of the users do not, however, know and use all or not even the most essential supplementary functions. Thus, there is great technical expenditure on functions which, in the final analysis, are little used and the possible advantages in serviceability are not realized.

25 As a rule, the supplementary functions are listed and explained in operating instructions of the device being discussed (for example of the telephone). Such operating instructions are in many cases of unsatisfactory structure and formulation and, therefore, are not or only superficially read by many users. In the daily use of the device, moreover, they are not continuously available to the user and, in conjunction with the abovementioned diminishing of interest in the functions of the device with increasing length of ownership, the operating instructions are no longer

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being used at all after some time. Thus, the operating instructions are not a suitable means for moving the user to explore the functions of his device in detail.

- 5 From DE 42 43 563 A1, a device for operating a device is known in which control processes are triggered by operating input keys, the frequency of use being detected and the order of individual control procedures or individual input keys being changed in accordance with the frequency of their use so that the control  
10 procedure used most frequently or, respectively, the control command used most frequently is at the beginning of the sequence.

- From EP 0 808 049 A2, an operating section of an electrical device is known in which a frequency of functional sequences selected by  
15 a user is detected and when a predetermined frequency is exceeded, function keys which are not yet occupied or are only rarely used are allocated frequently used functional sequences.

- The invention is based, therefore, on the object of specifying a  
20 method for operating an electronic device and an electronic device which, in particular, implements this method and by means of which a more efficient utilization of the functions of the device can be achieved.

- 25 This object is achieved by means of a method having the features of claim 1 with regard to the method aspect and by a device having the features of claim 6 with regard to its device aspect.

- The invention includes the fundamental technical concept of  
30 detecting the activation of functions offered and evaluating the result of the detection in the device. It also includes the concept

of displaying or outputting references to functions not used or used only little, in dependence on the result of the evaluation.

5 The results of the detection are preferably evaluated as logging of the frequency of use, i.e. the number of activations within a particular period (calendar period or period related to the switch-on times of the device), and a counter connected to the operating element for the respective function, in conjunction with a timer, can be used for this purpose.

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In a further advantageous embodiment, it is also possible to evaluate a trend of whether and to what extent the frequency of use of a particular function has changed within predetermined periods.

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- The reference to the little used functions is made in a simple and appropriate manner by means of pre-programmed short advisory texts which are displayed on an alphanumeric display of the device, which exists in any case, and/or also printed out with hard copy records and/or conveyed audibly. The advisory texts can contain, in particular, references to the operating instructions or other information sources. The advisory text output can also be selected in dependence on how the pattern of use evolves - in conjunction with the trend evaluation addressed above; for example, the user can be encouraged to use a function not previously used by a suitable text selection after the first attempts, or otherwise the advantages of the function in question can be selectively pointed out to him when a drop in frequency of use is registered.
- As examples of application for linking certain evaluation results with regard to the supplementary functions of a modern telephone to references directed to the user, the following can be mentioned:
- no call number memory occupied → explanation of the call number memories
  - no telephone directory entries → explanation of the telephone directory concept
  - last number redialling never used → text: "Do you know that it is possible to dial the last number from the last number redialling memory? If no, please refer to page 7 of the operating instructions"
  - mobile part never barred → reference to PIN input
  - only one mobile part logged into one DECT base station → reference to additional mobile parts
  - no internal call set up → reference that internal calls by other mobile parts are free of charge

The invention also provides for evaluating the frequency of use of selection functions and possibilities offered by the device, in addition to supplementary functions in the narrower sense. This can be, in particular, an evaluation of the frequency with which a particular call partner has been dialled from the electronic telephone directory. As a result of the evaluation, a particular advisory text can be generated here, too, which, for example, encourages a more frequent contacting of the corresponding subscriber or a reestablishment of contact after a prolonged period. In this sense, the invention also provides the possibility of implementing an "automatic relationship manager".

The device constructed for carrying out the invention exhibits a supplementary or selection function detection device, an evaluation device for evaluating the frequency of activation of the supplementary or selection function(s), a user information memory and a display or output control device for initiating the output of the advisory texts mentioned. In a further development of the device aspect, the evaluation device can exhibit the counter mentioned above and timer and optionally other counters and/or arithmetic calculating units for providing results of the evaluation or trend information relating to different periods.

Moreover, advantages and suitable applications of the invention are obtained from the subclaims and the subsequent description of preferred exemplary embodiments, referring to the figures, in which:

Figure 1 shows a schematic functional block diagram of the components of a feature telephone according to a first embodiment, which are essential in conjunction with the explanation of the invention, and

Figure 2 shows a schematic functional block diagram of the components of a car radio/CD changer combination according to a second embodiment of the invention, which are essential for carrying out the invention.

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Figure 1 shows a basic representation in the form of a functional block diagram of an arrangement 100A, implemented as part of a feature telephone 100, according to a first embodiment of the invention. The feature telephone exhibits a microprocessor 101  
10 which is associated in the usual manner with a main memory 101a, a program memory 101b and a timer 103. The telephone 100 has an input keypad 105 and a two-line alphanumeric display unit 107.

In the text which follows, the embodiment of the invention is  
15 explained with the example of two selected functions of the telephone 100, namely (a) with respect to the "last number redialling" function and (b) with respect to the frequency of contacting of a call partner entered in the electronic telephone directory.

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The last number redialling key of the input keypad 105 is connected to a first counter 109 and the speed dialling input element specified for the call partner mentioned is connected to a second counter 111. The counters 109 and 111 count the number of  
25 activations of the "last number redialling" function and of the establishment of contact with the specific call partner. A FIFO memory 113 is also connected to the last-mentioned input element and is also connected via a further input to the timer 103 and in which the last (calendar) time of the establishment of contact  
30 with the call party mentioned is in each case stored. The output of the first counter 109 is connected to a first arithmetic calculating unit 115 and the output of the second counter 111 is connected to a second arithmetic calculating unit 117. The first and second calculating unit 115, 117 is in each case also

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connected to the timer 103 and calculates the frequency of activation of the "last number redialling" function and of the frequency with which the specified call party has been dialled within a predetermined period. This period is stored in the main  
5 memory 101a and the calculation process and also the sequences explained subsequently are executed in accordance with program sequences stored in the program memory 101b.

The output of the first calculating unit 115 is connected, on the  
10 one hand, to a first frequency comparator unit 119 and, on the other hand, to the input of a third arithmetic calculating unit (trend calculating unit) 121. The trend calculating unit 121 - like the first and second arithmetic calculating unit, too - is also connected to the timer 103 and is controlled by the  
15 microprocessor 101. As its name indicates, it is used for determining a trend of the frequency of use of the "last number redialling" function over predetermined successive periods. The output of the trend calculating unit 121 is connected to a first input of a trend comparator unit 123, the second input of which is  
20 connected to a trend reference value memory 125. Similarly, a first frequency reference value memory 127 is connected to a second input of the abovementioned first frequency comparator unit 119.

25 The output of the second arithmetic calculating unit 117, too, is connected to one input of a (second) frequency comparator unit 129, the second input of which is connected to a (second) frequency reference value memory 131. The output of the FIFO memory 113 is connected to a subtraction stage 133 which is also  
30 connected to the timer 103 and calculates the time difference between the current date and the date of the last speed dialling to the specific call party. The substration stage 133 is followed in the circuit by a time difference comparator unit 135,



the second input of which is connected to a time difference reference value memory 137.

The comparator units 119, 123, 129 and 135 mentioned, in  
5 interaction with their associated reference value memories 125,  
127, 131 and 137, are used for determining whether the respective  
input value (frequency of use, trend value of use and time  
difference value, respectively) exceeds or drops below a  
predetermined threshold value, and for outputting an output signal  
10 characterizing the result of the comparison. All of them are  
connected to inputs of a memory control unit 139 which is  
connected to a text memory (user information memory) 141 and -  
naturally again under control by the microprocessor 101 - calls up  
predetermined advisory texts stored in the various memory areas  
15 141<sub>i</sub> of the text memory 141 in dependence on these respective  
output signals and displays them on the display unit 107 of the  
telephone 100.

Thus, for example during the determination of a frequency of use  
20 of the "last number redialling" function dropping below a  
particular reference frequency and/or having a falling trend (and,  
in particular, naturally, when this function is not used at all),  
a reference to the advantages of this function is displayed in the  
display 107. If no connection with the specified call party has  
25 been established over a predetermined period (time difference  
reference value) and/or if the frequency of the establishment of  
contact with this party drops below a predetermined reference  
value, a specific reference to the suitability of re-establishing  
contact with this party (for example an important business  
30 partner) is in each case displayed on the display 107.

Similar to what has been described above, time difference,  
frequency or trend evaluations with respect to the use of other  
functions of the telephone 100 can



*(The following are the names of the persons who have been elected to the various offices of the Association, as reported by the Secretary.)*

specific advisory texts can be displayed in each case as a result of the evaluation. In the case of a telephone system with hard copy reports, it is also possible to print out the corresponding references and, finally, a text announcement can also be implemented (particularly suitable in the case of a telephone with answering machine function). For the embodiment in a feature telephone outlined in figure 1, the use of calendar periods (days/weeks/months) without referring to a device operating period or real period of use is appropriate. Naturally, this embodiment is also possible in the same way in a cordless telephone or mobile telephone.

Figure 2 shows the embodiment of the invention in another field than that of communications engineering with the example of a car radio/CD changer combination. Here, too, only the components which are of importance in conjunction with the explanation of the invention are shown; for the rest, a conventional device configuration is assumed. The functional components of this arrangement largely correspond to those of the first embodiment and are designated to this extent with reference numbers derived from figure 1 and will not be explained again in the text which follows.

As examples of supplementary functions enhancing the value of use, (a) the "random" function (mixing the titles of a CD in accordance with the principle of randomness) and (b) selection of various CDs from the changer will be picked out here and an evaluation will be described which is simplified as compared with the evaluation modes of the first embodiment. (Due to this fact and due to the circumstances that components having similar functions should also receive similar reference numbers as in figure 1, the reference numbers in figure 2 no longer follow one another without gaps.)

THESE THINGS ARE NOT TO BE TAKEN AS A SIGN OF THE  
END OF THE WORLD, BUT AS A WARNING TO ALL MEN  
TO REPENT AND TURN TO GOD, THAT THEY MAY  
OBTAIN HIS MERCY AND GRACE, AND BE  
SAVED BY HIS BLOOD, WHICH IS THE ONLY  
WAY TO LIFE AND SALVATION.

timer 203 and naturally an operating keypad 205 and an alphanumeric display unit 207 in the usual manner and in principle analogously to the feature telephone according to figure 1. A first group of essential elements of the arrangement 200A for carrying out the invention are in this case a counter 209, connected to the operating keypad 205, for counting the operating processes for activating the "random" function, an arithmetic calculating unit 215, which follows the counter 209 and is also connected to the timer 203, for calculating the relative frequency of use of the said function, a frequency comparator unit 219 which is connected to the output of the calculating unit 215 and to the second input of which a frequency reference value memory 227 is connected.

A second group of essential functional components is formed by a FIFO memory 213, which is connected, on the one hand, to the input keypad 205 and, on the other hand, to the timer 203, for registering the last selection process in each case for a particular CD position in the changer part, a subtraction stage 233, connected to the output of the FIFO memory 213 and also to the timer 203, for determining the period which has elapsed since the last corresponding selection process, a time difference comparator unit 235 connected to the output of the subtraction stage 233 and a time difference reference value memory 237 connected to its second input. With regard to the remaining components of memory control unit 239 and text memory 241, reference is made to the above description for figure 1.

Thus, in the arrangement described last, the user of the car radio/CD changer combination 200 is supplied with corresponding references via the display 207 when he has not or very rarely used the "random" function of his device within a predetermined operating period or when he has not selected a particular CD in the changer

for a very long time. The latter reference can provide him with a stimulus for inserting another CD into this compartment which is more to his (possibly changed) taste.

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The embodiment of the invention is not restricted to the examples described but is also possible in a multiplicity of modifications for other devices and applications.

1. The invention relates to a device for the automatic control of a machine, characterized in that it comprises a control unit which is connected to a plurality of sensors and actuators, and in that the control unit is adapted to receive signals from the sensors and to send signals to the actuators, and in that the control unit is adapted to control the machine in a closed-loop manner.